

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Original) A rotary contactless connector comprising:

a rotary transformer (1) composed of a rotor (3) that has a transformer rotary winding (2) and an annular stator (5) that is concentric with the rotor (3) and has a transformer stator winding (4);

a rotating-side light emitting element (8) or a rotating-side light receiving element provided on the rotor (3); and

a stationary-side light emitting element or a stationary-side light receiving element (11) that is fixedly disposed to oppose the rotating-side light emitting element (8) or the rotating-side light receiving element,

wherein electric power is supplied to the rotor (3) through the rotary transformer (1) to perform optical communication, and

a power output of the rotary transformer (1) is divided into two outputs, one (1a) being directly coupled to the electric circuit (9), while the other (1b) being coupled to the electric circuit (9) through the intermediary of storage means (12) composed of a capacitor or a storage cell.

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

2. (Original) A rotary contactless connector according to Claim 1, wherein a nonmagnetic and non-magnetized bearing (6) is provided between the rotor (3) and the annular stator (5).

a' 3. (currently amended) A rotary contactless connector according to Claim 1, further comprising an electric circuit (9) for switchingly driving the rotating-side light emitting element (8) or the rotating-side light receiving element,

wherein electric power is supplied to the electric circuit (9) through the intermediary of the rotary transformer (1).

4. (Original) A rotary contactless connector according to Claim 3, wherein the electric circuit (9) is provided in the rotor (3).

5. (currently amended) A rotary contactless connector according to Claim 4 3, wherein at least another ~~the~~ rotating-side light emitting element (8) or the rotating-side light receiving element is provided at the central position of the rotor (3).

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

6. (currently amended) A rotary contactless connector ~~according to Claim 1~~
comprising:

a rotary transformer (1) composed of a rotor (3) that has a transformer rotary winding (2)
and an annular stator (5) that is concentric with the rotor (3) and has a transformer stator winding
(4);

a' a rotating-side light emitting element (8) or a rotating-side light receiving element
provided on the rotor (3); and

a stationary-side light emitting element or a stationary-side light receiving element (11)
that is fixedly disposed to oppose the rotating-side light emitting element (8) or the rotating-side
light receiving element.

wherein electric power is supplied to the rotor (3) through the rotary transformer (1) to
perform optical communication, and

a power output of the rotary transformer (1) is divided into two outputs, one (1a) being
directly coupled to the electric circuit (9), while the other (1b) being coupled to the electric
circuit (9) through the intermediary of storage means (12) composed of a capacitor or a storage
cell,

wherein a plurality of the rotating-side light emitting elements (8) or the rotating-side
light receiving elements are provided at the concentric circumferential positions other than the
central position of the rotor (3).

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

7. (currently amended) A rotary contactless connector ~~according to Claim 5~~,
comprising:

a rotary transformer (1) composed of a rotor (3) that has a transformer rotary winding (2)
and an annular stator (5) that is concentric with the rotor (3) and has a transformer stator winding
(4);

a
a rotating-side light emitting element (8) or a rotating-side light receiving element
provided on the rotor (3); and

a stationary-side light emitting element or a stationary-side light receiving element (11)
that is fixedly disposed to oppose the rotating-side light emitting element (8) or the rotating-side
light receiving element.

wherein electric power is supplied to the rotor (3) through the rotary transformer (1) to
perform optical communication, and

a power output of the rotary transformer (1) is divided into two outputs, one (1a) being
directly coupled to the electric circuit (9), while the other (1b) being coupled to the electric
circuit (9) through the intermediary of storage means (12) composed of a capacitor or a storage
cell.

wherein the rotating-side light emitting element (8) or the rotating-side light receiving
element is provided at the central position of the rotor (3), and

wherein a plurality of the rotating-side light emitting elements (8) or the rotating-side light receiving elements are provided at the concentric circumferential positions other than the central position of the rotor (3).

8. (currently amended) A rotary contactless connector ~~according to Claim 1,~~
comprising:

a' a rotary transformer (1) composed of a rotor (3) that has a transformer rotary winding (2)
and an annular stator (5) that is concentric with the rotor (3) and has a transformer stator winding
(4);

a rotating-side light emitting element (8) or a rotating-side light receiving element
provided on the rotor (3); and

a stationary-side light emitting element or a stationary-side light receiving element (11)
that is fixedly disposed to oppose the rotating-side light emitting element (8) or the rotating-side
light receiving element,

wherein electric power is supplied to the rotor (3) through the rotary transformer (1) to
perform optical communication, and

a power output of the rotary transformer (1) is divided into two outputs, one (1a) being
directly coupled to the electric circuit (9), while the other (1b) being coupled to the electric
circuit (9) through the intermediary of storage means (12) composed of a capacitor or a storage
cell,

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

wherein a plurality of the rotating-side light emitting elements (8) or the rotating-side light receiving elements are provided ~~in the~~ at a common radial direction distance from a central position of the rotor (3).

9. (currently amended) A rotary contactless connector ~~according to claim 5~~ comprising:

a' a rotary transformer (1) composed of a rotor (3) that has a transformer rotary winding (2) and an annular stator (5) that is concentric with the rotor (3) and has a transformer stator winding (4);

a rotating-side light emitting element (8) or a rotating-side light receiving element provided on the rotor (3); and

a stationary-side light emitting element or a stationary-side light receiving element (11) that is fixedly disposed to oppose the rotating-side light emitting element (8) or the rotating-side light receiving element,

wherein electric power is supplied to the rotor (3) through the rotary transformer (1) to perform optical communication, and

a power output of the rotary transformer (1) is divided into two outputs, one (1a) being directly coupled to the electric circuit (9), while the other (1b) being coupled to the electric circuit (9) through the intermediary of storage means (12) composed of a capacitor or a storage cell,

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

wherein the rotating-side light emitting element (8) or the rotating-side light receiving element is provided at the central position of the rotor (3), and

wherein a plurality of the rotating-side light emitting elements (8) or the rotating-side light receiving elements are provided ~~in the~~ at a common radial [direction] distance from the central position of the rotor (3).

a! 10. (Original) A non-rotary contactless connector comprising:

a first stationary member (101) having a transformer first winding (100);

a second stationary member (103) that is disposed to oppose the first stationary member (101) and has a transformer second winding (102);

a first light emitting element (110) or light receiving element provided on the first stationary member (101); and

a second light receiving element (111) or light emitting element provided on the second stationary member (103),

wherein electric power is supplied to the first stationary member (101) from the second stationary member (103) on a power-supplying side by means of magnetic coupling between the transformer windings (100 and 102) to perform optical communication,

an electric circuit (120) for driving the first light emitting element (110) or light receiving element in the first stationary member (101) is provided, and

electric power is supplied to the electric circuit (120) through the intermediary of the transformer first winding (100) or the transformer second winding (102).

11. (Original) A non-rotary contactless connector according to claim 10, wherein a power output of the transformer first winding (100) is divided in to two outputs, and one is directly coupled to the electric circuit (120), while the other is coupled to the electric circuit (120) through the intermediary of storage means (130) composed of a capacitor or a storage cell.

12. (New) The rotary contactless connector according to claim 1 further comprising a first switching circuit operative to switch at least one of said light emitting element and said light receiving element in accordance with the rotation of said rotor.

13. (New) The rotary contactless connector according to claim 12 further comprising a first plurality of light emitting elements or light receiving elements disposed circumferentially at a common radius, wherein said switching circuit is operative to switch said first plurality of said light emitting elements or said light receiving elements in accordance with the rotation of said rotor and provide communication in a first direction.

14 (New) The rotary contactless connector according to claim 13 further comprising at least a second plurality of light receiving elements or light emitting elements disposed circumferentially at a common radius and being switchably controlled to provide communication in a second direction opposite said first direction, whereby simultaneous bi-directional communication is provided.

a' 15. (New) The rotary contactless connector according to claim 13 further comprising at least a second plurality of light receiving elements or light emitting elements disposed circumferentially at a common radius different from that of said first plurality of elements, and a second switching circuit, wherein said second switching circuit is operative to switch said second plurality of light emitting elements or light receiving elements in accordance with the rotation of said rotor, whereby simultaneous bi-directional communication is provided.

16. (New) A rotary contactless connector comprising:

a rotary transformer composed of a rotor defining a rotary side and having a transformer rotary winding and an annular stator defining a stationary side and being concentric with the rotor and having a transformer stator winding;

a plurality of rotating side elements, comprising at least one of rotating-side light emitting elements or rotating-side light receiving elements, provided on the rotor;

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

a plurality of stationary side elements, comprising at least one of stationary-side light emitting elements or stationary-side light receiving elements, that are disposed for optical coupling with the rotating-side elements, and

a switching circuit disposed on at least one of said stationary side and said rotary side, and being operative to switchably optically couple at least one of said plurality of rotating side elements to at least one of said plurality of stationary side elements,

AI wherein electric power is supplied to the rotor through the rotary transformer to enable optical communication.

17. (New) The rotary contactless connector according to claim 16 wherein a plurality of said rotary side elements are arranged along a common circumferential locus and comprise only one of light transmitting or light receiving elements.

18. (New) The rotary contactless connector according to claim 17 wherein a plurality of said rotary side elements are arranged along a common circumferential locus and comprise both light transmitting and light receiving elements.

19. (New) The rotary contactless connector according to claim 16, wherein a plurality of said rotary side elements are arranged along a common circumferential locus and comprise only one of light transmitting or light receiving elements,

AMENDMENT UNDER 37 C.F.R. §1.111
USSN: 09/935,710

wherein an output of two light emitting elements does not enter a range of one light receiving element at the same time, and

wherein one light emitting element output enters the range of two light receiving elements at the same time,

whereby said switching device is controlled to provide continuous optical communication as said rotor is rotated.

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20. (New) The rotary contactless connector according to claim 16 wherein,

a first plurality of said rotary side elements are arranged along a first common circumferential locus and comprise at least light transmitting elements, and

a second plurality of said rotary side elements are arranged along a second common circumferential locus and comprise at least light receiving elements, and

wherein said first plurality of rotary side elements and said second plurality of rotary side elements are optically coupled to stationary side elements and are adapted to provide simultaneous bidirectional communication.

21. (New) The rotary contactless connector according to claim 20 wherein said optical coupling between rotary side elements and stationary side elements is a switched coupling.
